

## PATENT SPECIFICATION

Application Date: Sept. 2, 1935. No. 24470/35.

461,570

(Patent of Addition to No. 400,742: dated Aug. 8, 1932.)

Complete Specification Left: Sept. 2, 1936.

Complete Specification Accepted: Feb. 19, 1937.



## PROVISIONAL SPECIFICATION

## Improvements in the Manufacture and Production of the Transparent Parts of Metal Vapour Lamps and the like

We, I. G. FARBENINDUSTRIE AKTIEN-GESELLSCHAFT, of Frankfort-on-Main, Germany, a Joint Stock Company organized under the Laws of Germany, and  
 5 GEORGE WILLIAM JOHNSON, a British Subject, of 47, Lincoln's Inn Fields, in the County of London, Gentleman, do hereby declare the nature of this invention to be as follows:—

- 10 For instruments or apparatus which contain glass parts which are exposed to attack by liquid or vaporous alkali metals, light metals or the like, in particular for illuminating tubes having alkali metal  
 15 vapour fillings or other discharge tubes with atomising light metal electrodes, there has hitherto been no material which, when used for the preparation of such parts, could withstand for long periods the  
 20 attack of the metals or their vapours. It has already been proposed for the purpose of overcoming the said drawback to replace the silicic acid in the glass to a large extent by boric acid, but glasses having a  
 25 high content of boric acid have the drawback that they have but slight resistance to moisture and substances in the atmosphere. In order to protect such glasses, it is therefore necessary to jacket or en-  
 30 case them with other resistant glasses.

It has now been found that glasses com-

posed in accordance with the specification No. 400,742 and containing  $Al_2O_3$  in an excess above the molecular ratio  $Al_2O_3:P_2O_5=1:1$  up to 30 per cent. by 35 weight of the glass, do not have the said drawbacks. In addition to resistance to the action of fused or vaporous alkali metals, light metals or the like, they have a high resistance to water and a very good 40 permeability to light so that, for example, illuminating tubes which emit mainly visible light and in which the transparent parts are exposed to the attack of fused or vaporous alkali metals, light metals or the 45 like may be prepared from the said glasses. The said glasses are thus very suitable as materials for the light-permeable parts of sodium vapour lamps which have recently become important for the 50 dazzle-free illumination of traffic roads. In this and similar cases in which the permeability of the glass for ultra-violet light is not important or may even be undesirable, the raw materials used need not be 55 free from iron, titanium and other constituents impairing the permeability for ultra-violet light and cheaper raw materials may therefore be used.

Glasses of the following compositions 60 have proved especially suitable.

	$K_2O$	$Na_2O$	$CaO$	$BaO$	$MgO$	$SiO_2$	$Al_2O_3$	$B_2O_3$	$P_2O_5$
A	9.0	—	4.5	27.2	—	9.0	24.6	9.7	16.0
B	—	10.0	—	10.0	10.0	5.0	31.3	25.0	8.7
C	—	—	—	10.0	13.0	10.0	31.3	20.0	15.7
D	—	—	—	10.0	10.0	20.0	26.3	25.0	8.7
E	3.0	—	—	10.0	5.0	20.0	28.3	25.0	8.7

Dated this 2nd day of September, 1936.

J. Y. & G. W. JOHNSON,  
 47, Lincoln's Inn Fields, London,  
 W.C. 2,  
 Agents.

[Price 1/-]

Price 4s 6d

## COMPLETE SPECIFICATION

# Improvements in the Manufacture and Production of the Transparent Parts of Metal Vapour Lamps and the like

We, I. G. FARBENINDUSTRIE AKTIEN-GESELLSCHAFT, of Frankfort-on-Main, Germany, a Joint Stock Company organized under the Laws of Germany, and  
 5 GEORGE WILLIAM JOHNSON, a British Subject, of 47, Lincoln's Inn Fields, in the County of London, Gentleman, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement:—

For instruments or apparatus which contain glass parts which are exposed to  
 15 attack by liquid or vaporous alkali metals, light metals or the like, in particular for illuminating tubes having alkali metal vapour fillings or other discharge tubes with atomising light metal electrodes, there has hitherto been no material which  
 20 when used for the preparation of such parts, could withstand for long periods the attack of the metals or their vapours. It has already been proposed for the purpose of overcoming the said drawback to  
 25 replace the silicic acid in the glass to a large extent by boric acid, but glasses having a high content of boric acid have the drawback that they have but slight  
 30 resistance to moisture and substances in the atmosphere. In order to protect such glasses, it is therefore necessary to jacket or encase them with other resistant glasses.

It has now been found that glasses com-  
 35 posed in accordance with the specification No. 400,742 and containing besides not more than 25 per cent. by weight of silica  $Al_2O_3$  in an excess above the molecular ratio  $Al_2O_3:P_2O_5=1:1$  up to 30 per cent.  
 40 by weight of the glass, preferably between 12 and 30 per cent, do not have the said drawbacks. In addition to resistance to the action of fused or vaporous alkali metals, light metals or the like, they have  
 45 a high resistance to water and a very good permeability to light, so that, for example, illuminating tubes which emit mainly visible light and in which the transparent parts are exposed to the attack of fused or  
 50 vaporous alkali metals, light metals or the like may be prepared from the said glasses. The said glasses are thus very suitable as materials for the light-permeable parts of sodium vapour lamps which  
 55 have recently become important for the dazzle-free illumination of traffic roads. In this and similar cases in which the permeability of the glass for ultra-violet light is not important or may even be un-  
 60 desirable, the raw materials used need not be free from iron, titanium and other constituents impairing the permeability for ultra-violet light and cheaper raw materials may therefore be used.

Glasses of the following compositions have proved especially suitable.

		K <sub>2</sub> O	Na <sub>2</sub> O	CaO	BaO	MgO	SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	B <sub>2</sub> O <sub>3</sub>	P <sub>2</sub> O <sub>5</sub>
70	A	9.0	—	4.5	27.2	—	9.0	24.6	9.7	16.0
	B	—	10.0	—	10.0	10.0	5.0	31.3	25.0	8.7
	C	—	—	—	10.0	13.0	10.0	31.3	20.0	15.7
	D	—	—	—	10.0	10.0	20.0	26.3	25.0	8.7
	E	3.0	—	—	10.0	5.0	20.0	28.3	25.0	8.7

Having now particularly described and  
 75 ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. Apparatus containing glass parts  
 80 which are exposed to attack by liquid or vaporous alkali metals, light metals or the like, the said glass being composed in accordance with Specification No. 400,742 and containing besides not more than 25

per cent. by weight of silica  $Al_2O_3$  in an  
 85 excess above the molecular ratio  $Al_2O_3:P_2O_5=1:1$  up to 30 per cent. by weight of the glass, preferably between 12 and 30 per cent.

2. Apparatus containing glass parts  
 90 which are exposed to attack to liquid or vaporous alkali metals, light metals or the like, the said glass having any of the compositions herein specified as proving especially suitable.

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Dated this 2nd day of September, 1935.      J. Y. & G. W. JOHNSON,  
47, Lincoln's Inn Fields, London,  
W.C. 2,  
Agents.

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